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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,387	11/19/2001	Paul Van Der Veen	P 284021 P-0217.010-US	8241

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PILLSBURY WINTHROP, LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER	
JOHNSTON, PHILLIP A	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/988,387	VAN DER VEEN, PAUL	
	Examiner	Art Unit	
	Phillip A Johnston	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Action

Claims Rejection – 35 U.S.C. 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,369,398 to Gelernt, in view of Kleinschmidt, U.S. Patent No. 6,160,832 and in further view of Makinouchi, U.S. Patent No. 6,490,025.

Gelernt (398) discloses a lithographic system used in the fabrication of integrated circuits (IC). A source of radiation 110 exposes a radiation sensitive material 160, known as a resist that has been coated on the substrate surface 180. The resist 160 is typically a polymeric material, which undergoes structural or chemical changes upon exposure to the incident radiation. The incident radiation, which is typically of narrow bandwidth, is either provided by conventional light sources such as a mercury lamp, or excimer laser systems such as krypton fluoride (KrF) or argon fluoride (ArF). For example, the bandwidth of the incident radiation may be controlled by the use of an

appropriate filter 115. A mask 130, or reticle, is positioned between the light source 110 and the substrate 180 containing the resist layer 160. A typical optical imaging system for photolithography comprises a lens component 120 used to collimate the light, or radiation, to illuminate the mask 130. The light, which is transmitted through the mask 130 is subsequently focused by additional imaging optics 140 onto the resist layer 160. The mask 130 contains regions such as 130a that transmit the radiation and regions 130b that block the radiation. A typical mask, for example, consists of a chrome pattern (corresponding to a circuit pattern) that has been formed over a quartz substrate 132. While quartz is transparent to the incident radiation, the chrome pattern prevents the radiation from reaching the resist layer 160. For example, this lithographic exposure step may render the exposed resist region soluble to a chemical in a subsequent developing step, and allows the circuit pattern to be transferred to the resist layer. See Column 1, line 31-59.

Gelernt (398) as applied above does not disclose the use of an acoustic sensor to detect sounds caused by the passage of pulses of radiation of the projection system, as recited in Claim 1. However, Kleinschmidt (832) discloses a laser calibration system for lithography that utilizes a microphone for photoacoustic detection. Figure 1a shows the ArF-excimer laser chamber 1 emitting around 193 nm, surrounded by various optical and electrical components. The laser chamber 1 normally has tilted windows, e.g., at Brewster's angle. The laser system includes a resonator comprising a highly reflective mirror 10, a polarizer 13, a beam splitter 9a and a wavelength narrowing and tuning block 5. The system further includes a

wavelength calibration system including a wavelength calibration module 2 (galvatron). See Column 4, line 41-52.

Kleinschmidt (832) also discloses, that the galvatron may be used in a different way as shown in FIG. 1b, wherein FIG. 1b includes the setup of FIG. 1a and additionally includes a photodetector arranged near the galvatron. In the system of FIG. 1b, the galvatron serves as a module 2 filled with the element 21 in gaseous form, as described above. The gaseous element 21 may be caused to fill the galvatron by forming the cathode 22 of the galvatron out of the element 21 in solid form, and running a current between the anode 23 and the cathode 22 of sufficient amplitude to sublimate the element 21.

The voltage across the anode and cathode are not monitored in the system of FIG. 1b, as they are with the system of FIG. 1a (i.e., for the purpose of detecting energy level resonances in species of the element 21 induced by the incident light). Instead, the intensity of the light as it passes through the galvatron is detected. By so doing, absorption lines of the element 21 are detected when the detected intensity is reduced below that which is expected at the wavelengths corresponding to the absorption lines. Since the absolute wavelengths of photoabsorption are known for the element 21, the absolute wavelength of the laser light is determinable. See Column 5, line 52-67; and Column 6, line 1-6.

Kleinschmidt (832) further discloses a variation of the techniques described above with respect to FIGS. 1a, 1b and 9 is the following. Instead of using the

optogalvanic effect, or measuring the absorption through the gas of the module using, e.g., a photodiode or photomultiplier tube, a microphone for photoacoustic detection may be used. The rest of the preferred method and apparatus is the same as described above. See Column 10, line 59-65.

Therefore it would have been obvious to one of ordinary skill in the art that Gelernt's (398) lithographic exposure system can be modified to use the acoustic detection apparatus and method in accordance with Kleinschmidt (832), to measure the intensity of the laser lithographic radiation source.

Regarding Claim 5, Gelernt (398) in view of Kleinschmidt (832) discloses a lithographic exposure system that utilizes an acoustic sensor, but does not disclose the use of a vibration sensor mechanically coupled to an object on which the projection beam is incident. However, Makinouchi (025); discloses an exposure apparatus for projecting an image pattern on a mask onto a photosensitive substrate, including: a body including a projecting optical system through which the image pattern is projected from the mask to the photosensitive substrate; a first stage movable to the body and adapted to mount the mask; a second stage movable to the body and adapted to mount the photosensitive substrate; a measuring device for measuring the position of either one of the mask mounted on the first stage and the photosensitive substrate mounted on the second stage; a vibration sensor for measuring vibration of the body; and a position controller for controlling the position of either one of the mask mounted on the first stage and the photosensitive substrate mounted on the second

stage based on a measurement value of the vibration sensor and a measurement value of the measuring device. See Abstract.

Therefore it would have been obvious to one of ordinary skill in the art that the lithographic of Gelernt (398) in view of Kleinschmidt (832) can be modified to use the vibration detection apparatus and method of Suzuki (220) to detect vibration on the substrate, as recited in Claim 5.

Conclusion

3. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (703) 305-7022. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (703) 308-4116. The fax phone numbers are (703) 872-9318 for regular response activity, and (703) 872-9319 for after-final responses. In addition the customer service fax number is (703) 872- 9317.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

PJ

September 10, 2003

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800